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REPORT

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COUNTRY USSR

DATE DISTR. 12 Nov. 1953

SUBJECT Large Smeltery of the Noril'sk Nickel Combine

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25X1

DATE OF IN

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1. The Large Smeltery (Bol'shoy plavil'nyy tsekh) of the Noril'sk Nickel Combine in Noril'sk /N 69-20, E 88-06/ smelted nickel and copper ore. The smeltery consisted of one large 25X1 building, where the smelting process was conducted, and one small 25X1 building, where reclaimable particles were collected. Included in the large building were three separate sections, one of which was subdivided into two parts. /See Annex A for sketch of 25X1 the plant layout./. In Section A, nickel-copper ore was smelted and the two metals separated. In Sections B and D, the two metals were refined. Section C contained motors and compressors for providing air under pressure to the furnaces. the number of 25X1 workers at this factory at about 800, about 300 prisoners and about 500 free workers.

2. Section A contained three water-jacketed furnaces and four converters.

   a. Of the three water-jacketed furnaces, only two were ever in operation at one time, one of them being always under repair. These furnaces were about 13 m. high and about 9 x 6 m. at the top, gradually tapering down toward the bottom. They were capped by

25 YEAR RE-REVIEW

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SECURITY INFORMATION

25X1

a triangular cover. The furnace was loaded with ore, limestone, and coke from the top, usually to about four meters from the top. Air was forced in from the bottom through 25 to 50 holes. The melted ore poured out into a basin at the bottom of the furnace, at which time its temperature was 1,300° C. The slag was poured off at the top of this basin continuously at a temperature of 1,100° C; the matte (shteyn) was poured off at the bottom, at one-half hour to one hour intervals, at a temperature of 1,200° C. The slag from one of the furnaces was dumped on a slag dump, while the slag from the other furnace was taken to an area outside the building and then shipped to some other installation in the Noril'sk Nickel Combine [redacted] this slag was taken to Plant No. 25 [redacted] 25X1

The matte was placed in the converters in Section A. The people working around these furnaces had to wear gas masks, but most of them disposed of the mask and merely inserted the tube into their mouths. The workers wore felt boots, and their clothing had asbestos woven into it. Their mittens had asbestos facing and canvas backing. Although the gloves were supposed to last for a month and the clothing for a year, they actually wore out in two days and three months respectively. Workers could only get additional clothing if they bought it themselves. Occasionally the walls of the furnace would crack and the water striking the hot brick walls of the furnace would make an explosion similar to a cannon being fired. [redacted] When this 25X1 happened, the furnace was out of operation for some time for repairs. Another difficulty encountered in working around these furnaces was that the opening through which the metal was poured into the basin was not always closed. When it was left open, it usually took several days to clear the floors of the molten metal.

b. The four converters in Section A were about 3.5 m. in diameter and about 6 m. in length. 1. The matte from the furnaces in Section A was placed into these converters and silicate and "sulfat" added. 2. The molten metal from the converter was then poured into cup-shaped molds about 1.5 m. deep and permitted to cool. When inverted, the resulting mold was nickel-colored on top and copper-colored on the bottom. These molds were then crushed by dropping a very heavy block of iron on them, and the two metals were then separated into two piles. [redacted] 25X1 [redacted] the copper was put back into either a water-jacketed furnace or into a converter, melted, poured into molds, and then sent to the electrolytic plant. (Beginning in 1951, copper was no longer smelted here [redacted] 25X1 copper was smelted instead at the new Copper Smelting Plant [redacted] to 10 km. from Noril'sk.) [redacted] the nickel was ground and sent to Section B of the Large Smeltery.

c. Section A also had five cranes. Two large cranes passed over the converters; one small one went over the three furnaces; and two large ones passed over the crushing and grinding machinery.

3. [redacted] 25X1 nickel was further refined there. Section B contained two stoves of one kind /See Annex B for [redacted] sketch of 25X1 these stoves./, a stove of another kind /See Annex C for [redacted] 25X1 sketch of this stove./, and four grinding or crushing machines [redacted] 25X1 [redacted] sawdust was mixed with nickel powder 25X1 and placed into the furnaces to be dried. From here [redacted] it went 25X1 to Section C.

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4. Section C had three furnaces and produced nickel anodes about 50 cm. x 50 cm. x 3 cm. in size. One or two of these furnaces poured metal into molds. 3.

5. Section D contained compressors and other electrical equipment for creating forced draft for the furnaces

6. There were several methods of collecting reclaimable particles in the smoke from this factory. Smoke passed from the factory to Section E /See Annex A/ through pipes; on the way to Section E particles fell into small carts /See Annex D for sketch of the Large Smeltery and the method of collecting reclaimable particles./ In Section E additional particles were collected before the smoke went out through a 130 m. stack. Another stack, 155 m. high and generally known as the tallest stack in Noril'sk, was also connected with the collection of reclaimable particles

1.

2. Comment: the second substance as "sulfat" looked and tasted like salt but was not crystalline. It was prepared in a special oven, permitted to cool, and then broken up into pieces before being placed in the converter. about 10 tn. of this "sulfat" were used in an eight-hour shift.

3. Comment: nickel anodes were cast on a wheel

this method had been tried but that they could not make it work properly and subsequently discontinued it.

/Annex A: Sketch of the Plant Layout of the Large Smeltery. Annex B: Sketch of the Two Identical Stoves in Section B of the Large Smeltery. Annex C: Sketch of the Stove in Section B of the Large Smeltery. Annex D: View of Large Smelting Plant./

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Annex A: [redacted] Sketch of the Plant Layout of the Large Smeltery

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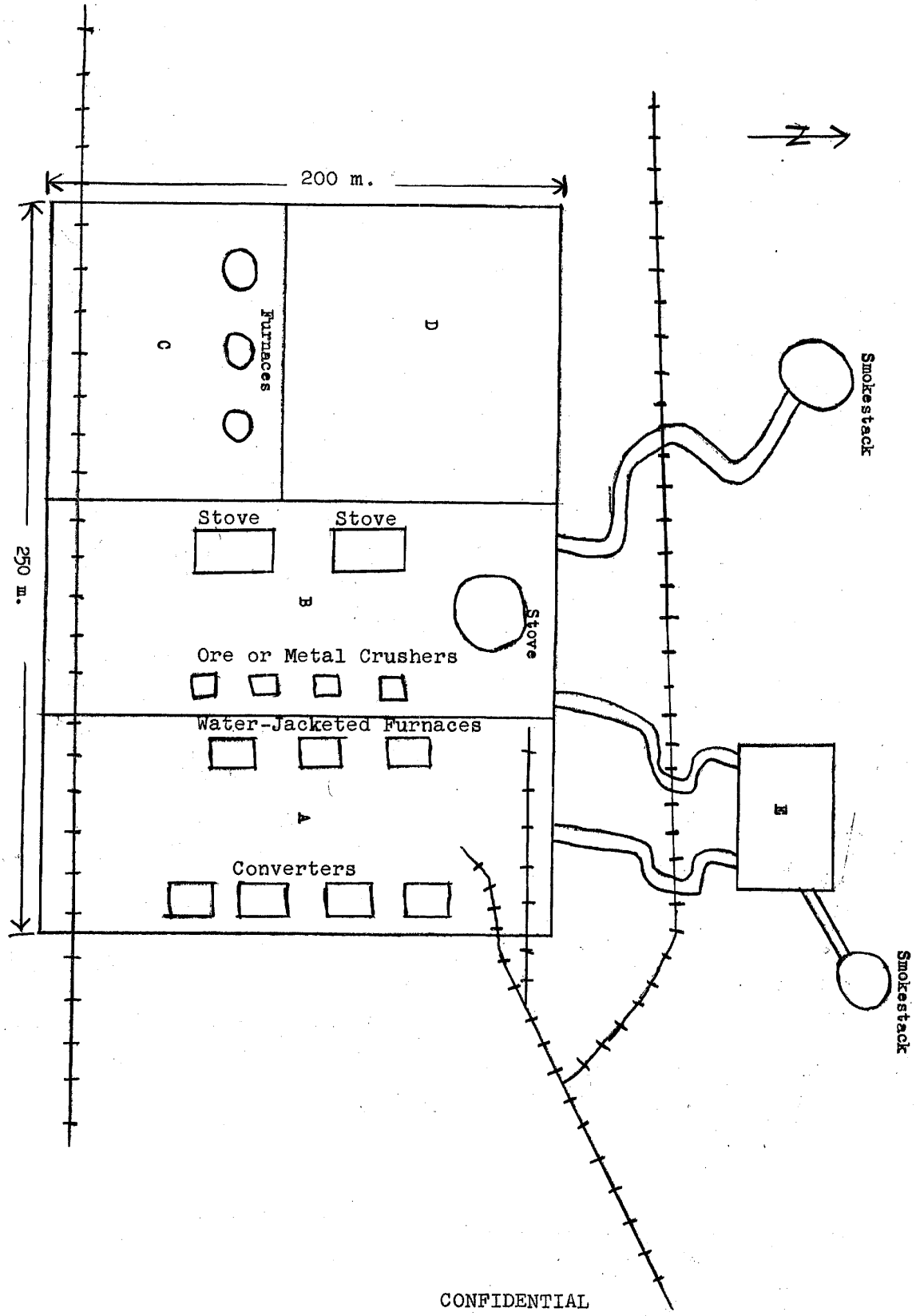

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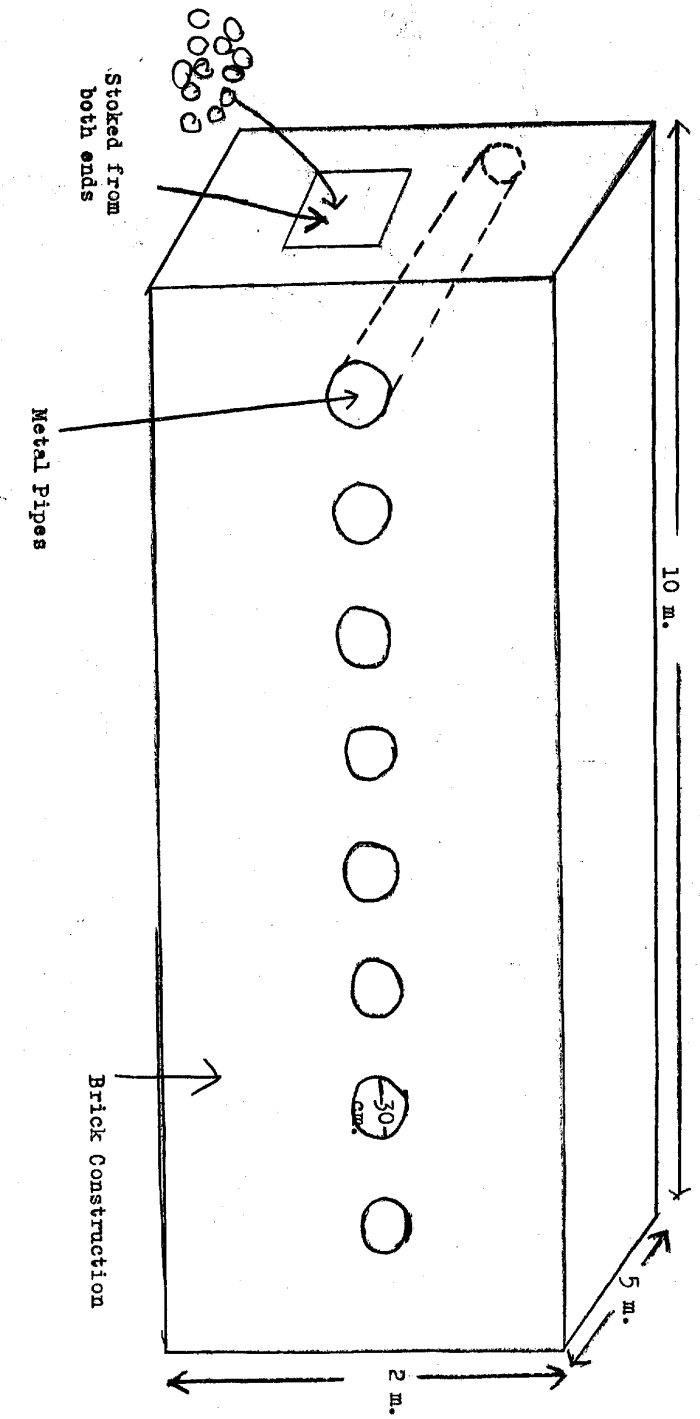
Annex B: [redacted] Sketch of the Two Identical Stoves in Section B of the Large Smeltery 25X1



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Annex C: [redacted] Sketch of the Stove in Section B of the Large Smeltery

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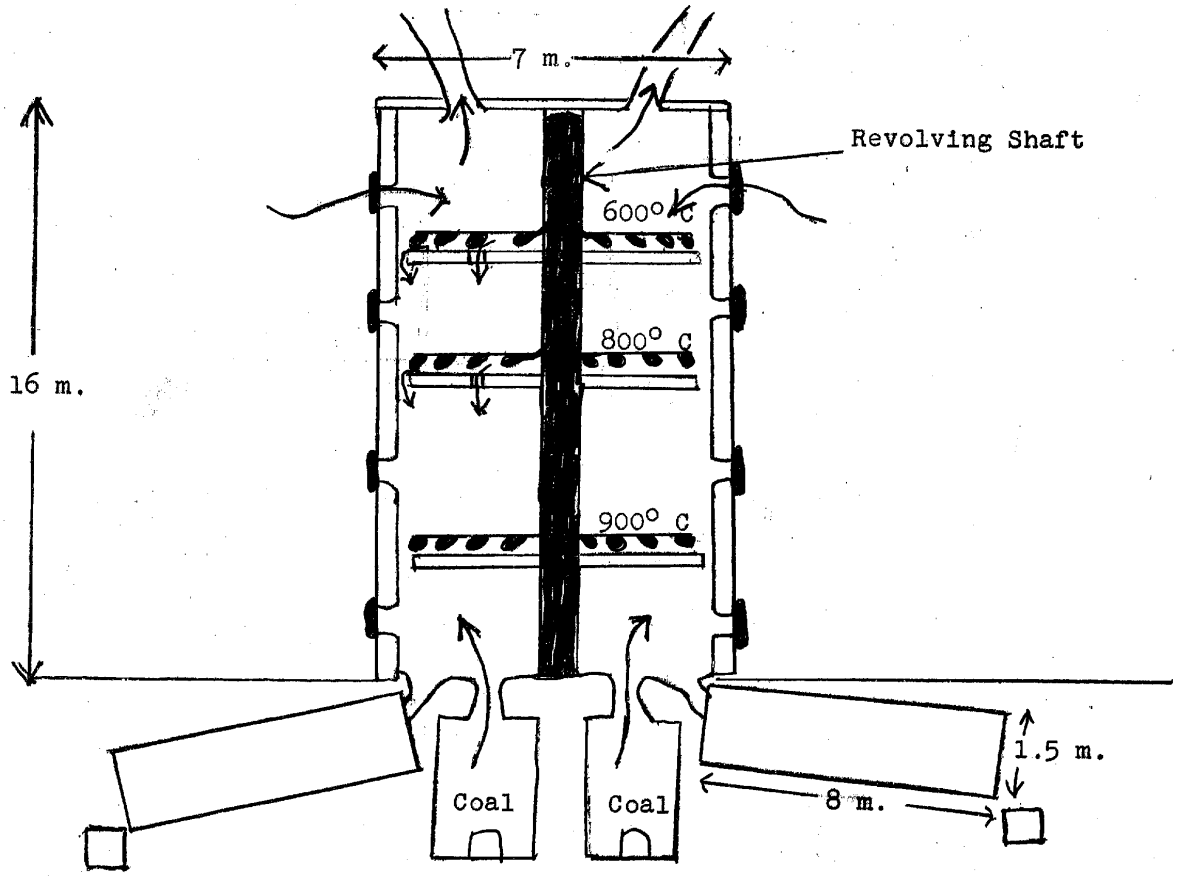

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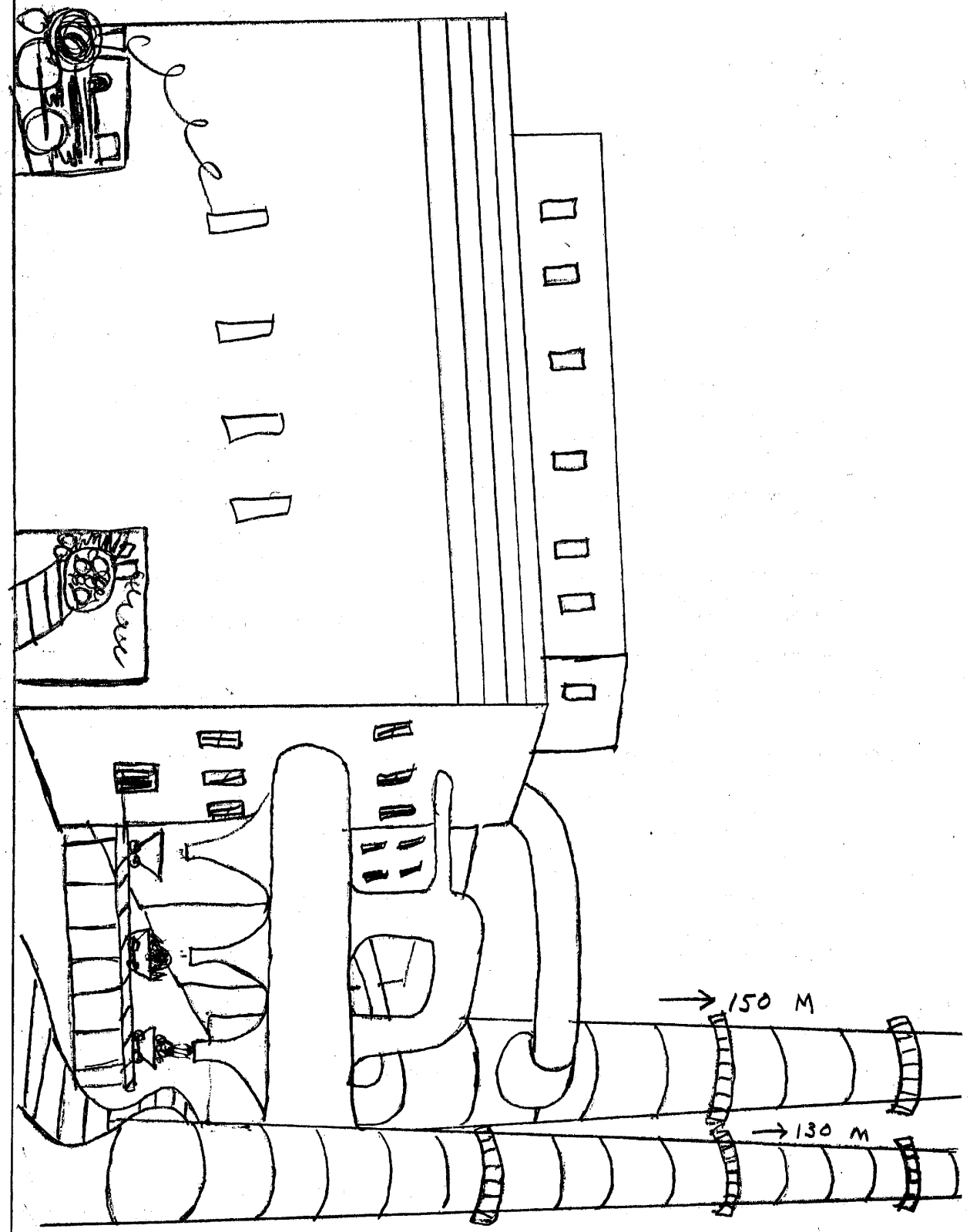
Annex D: View of Large Smelting Plant



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